

Amendments to the Claims

1. (Currently Amended) A computer implemented method for producing [[a]] sets of data values or tuples to be used sets domain for [[a]] data structure elements of [[an]] a ~~executable computer program during testing and validation of the computer program to be used to target efficient testing of behavior of the program when executed, the executable computer~~ program having been compiled into executable form, the method comprising:

~~receiving domain configuration information corresponding to the data structure element;~~

receiving reading a reflection of the executable computer program, the computer program comprising one or more first data structure elements and a second data structure element during a first execution of the program;

~~receiving domain configuration information corresponding to the data structure element~~ comprising:

one or more first mathematical or programmatic expressions related to configuring one or more first data domains corresponding to the one or more first data structure elements, each of the one or more first data domains corresponding to one of the one or more first data structure elements; and

one or more second mathematical or programmatic expressions related to configuring a second data domain corresponding to the second data structure element, the second mathematical or programmatic expressions operable on the one or more first data domains;

producing the one or more first data domains by evaluating the one or more first mathematical or programmatic expressions, the one or more first data domains comprising one or more values or tuples generated from evaluating the one or more first mathematical or programmatic expressions; and

producing the second data domain by evaluating the one or more second mathematical or programmatic expressions, the second data domain comprising one or more values or tuples generated from evaluating the one or more second mathematical or programmatic expressions;

and

wherein each data domain defines a set of values or tuples to be used for the corresponding data structure element during testing and validation of the computer program, and

the second data domain contains at least one value or tuple not included in the one or more first data domains.

~~based on the domain configuration information and the reflection of the executable computer program comprising the result the one or more values or sets of values resulting from the explicit expression;~~

~~a limited set of data values to be used as input during a subsequent second executions of the computer program for testing the executable computer program when executed;~~

~~targeting testing during the second execution of the executable computer program to use only values for the data structure element that fall within the data domain; and~~

~~determining whether the executable computer program behaves correctly during the second execution when executing using targeted values falling within the data domain as input.~~

2-3. (Canceled)

4. (Original) The method of claim 1 further comprising annotating code of the computer program with the domain configuration information.

5. (Currently Amended) The method of claim 4, further comprising compiling the code of the computer program annotated with the domain configuration information for producing the one or more first data domains and second data domain data domains according to its the domain configuration information.

6-7. (Canceled)

8. (Currently Amended) The method of claim [[7]] 1, wherein the one or more first mathematical or programmatic expressions or the one or more second mathematical or programmatic the expressions comprise methods and functions defined within the code of the computer program, which are exposed via the reflection of the computer program.

9-12. (Canceled)

13. (Currently Amended) The method of claim [[12]] 1, wherein the a third data structure element of the computer program is a data type comprising a plurality of sub-types, and the domain configuration information further comprises a selection of one or more data domains corresponding to the one or more of first data structure elements that are sub-types of the data type of the plurality of sub-types, wherein the a third data domain to be produced corresponding to for the third data structure element type is a union of the selected data domains of the sub-types belonging to the selection; and

the method further comprises producing the third data domain, the third data domain defining a set of values or tuples to be used for the third data structure element during testing and validation of the computer program.

14. (Currently Amended) The method of claim [[12]] 1, wherein the a third data structure element of the computer program is a field or a parameter of a designated data type and the domain configuration information further comprises information indicating that the a third data domain to be produced for corresponding to the third data structure element field or the parameter is inherited from one of the one or more first data domains corresponding to the one or more first data structure elements of the designated data type; and of their designated type

the method further comprising producing the third data domain, the third data domain defining a set of values or tuples to be used for the third data structure element during testing and validation of the computer program.

15. (Canceled)

16. (Currently Amended) The method of claim [[15]] 1, wherein the one or more second mathematical or programmatic expressions comprises one or more predicates such that the second data domain comprises values or tuples that meet the one or more predicates further comprising filtering the result of the applying domain generation technique step using a predicate.

17. (Currently Amended) The method of claim [[15]] 1, wherein the a third data structure element of the computer program is a data type with a plurality of fields, and the

domain configuration information further comprises information indicating that a third data domain corresponding to the third data structure element is inherited from one or more first data domains corresponding to the one or more first data structure elements that are fields of the data type; and

the method further comprises producing the third data domain, the third data domain defining a set of values or tuples to be used for the third data structure element during testing and validation of the computer program and the other data domains are data domains of the fields.

18. (Currently Amended) The method of claim [[15]] 1, wherein ~~the~~ a third data structure element of the computer program is a method and the domain configuration information further comprises information indicating that a third data domain corresponding to the third data structure element is inherited from one or more first data domains corresponding to one or more first data structure elements that are parameters of the method; and

the method further comprises producing the third data domain, the third data domain defining a set of values or tuples to be used for the third data structure element during testing and validation of the computer program.

19. (Currently Amended) ~~A system for One or more computer-readable media storing computer-executable instructions for performing a method for producing [[a]] sets of data values or tuples to be used-sets domain-for [[a]] data structure elements of [[an]] a-executable-computer program during testing and validation of the computer program-to be used-to-target efficient testing of the program when executed, the executable computer program having been compiled into executable form, the system method comprising:~~

~~a computer apparatus configured to perform the actions of a domain configuration manager-for;~~

~~receiving domain configuration information corresponding to the data structure element;~~

~~producing a reflection of the executable computer program during a first execution of the program;~~

~~using the reflection of the executable computer program to produce the data domain for the data structure element according to the domain configuration information;~~

the data domain representing a limited set of data values to be used as input for testing the executable computer program when executed; and

controlling testing during a second execution of the executable computer program to use only values for the data structure element that fall within the data domain receiving a reflection of the computer program, the computer program comprising one or more first data structure elements and a second data structure element;

receiving domain configuration information comprising:

one or more first mathematical or programmatic expressions related to configuring one or more first data domains corresponding to the one or more first data structure elements, each of the one or more first data domains corresponding to one of the one or more first data structure elements; and

one or more second mathematical or programmatic expressions related to configuring a second data domain corresponding to the second data structure element, the one or more second mathematical or programmatic expressions operating on the one or more first data domains;

producing the one or more first data domains by evaluating the one or more first mathematical or programmatic expressions, the one or more first data domains comprising one or more values or tuples generated from evaluating the one or more first mathematical or programmatic expressions; and

producing the second data domain by evaluating the one or more second mathematical or programmatic expressions, the second data domain comprising one or more values or tuples generated from evaluating the one or more second mathematical or programmatic expressions;

and

wherein each data domain defines a set of values or tuples for the corresponding data structure element to be used during testing and validation of the computer program, and the second data domain contains at least one value or tuple not included in the one or more first data domains.

20-23. (Canceled)

24. (Original) The ~~system~~ one or more computer-readable media of claim [[23]] 19, wherein the one or more first mathematical or programmatic expressions or the one or more second mathematical or programmatic ~~the explicit~~ expressions comprise[[s]] methods and functions defined within the computer program and exposed to ~~the domain configuration manager~~ via the reflection of the computer program.

25-33. (Canceled)

34. (New) A computer implemented method for producing sets of data values or tuples to be used for data structure elements of a computer program during testing and validation of the computer program, the method comprising:

receiving a reflection of the computer program, the computer program comprising one or more first data structure elements, a second data structure element and a third data structure element, wherein the third data structure element is a data type and a plurality of the one or more first data structure elements are sub-types of the data type;

receiving domain configuration information comprising:

one or more first mathematical or programmatic expressions related to configuring one or more first data domains corresponding to the one or more first data structure elements, each of the one or more first data domains corresponding to one of the one or more first data structure elements;

one or more second mathematical or programmatic expressions related to configuring a second data domain corresponding to the second data structure element, the one or more second mathematical or programmatic expressions operable on the one or more first data domains; and

a selection of one or more of the one or more first data structure elements that are sub-types of the third data structure element, wherein a third data domain corresponding to the third data structure element is a union of data domains corresponding to the selected first data structure elements, the selected first data structure elements excluding at least one of the one or more first data structure elements that are a sub-type of the third data structure element;

producing the one or more first data domains by evaluating the one or more first mathematical or programmatic expressions, the one or more first data domains comprising one or

more values or tuples generated from evaluating the one or more first mathematical or programmatic expressions; and

producing the second data domain by evaluating the one or more second mathematical or programmatic expressions, the second data domain one or more values or tuples generated from evaluating the one or more second mathematical or programmatic expressions; and

producing the third data domain; and

wherein each data domain defines a set of values or tuples to be used for the corresponding data structure element during testing and validation of the computer program, and the second data domain contains at least one value or tuple not included in the one or more first data domains.

35. (New) The method of claim 1, wherein the one or more second mathematical or programmatic expressions comprise a Cartesian product operating on at least two of the one or more first data domains.

36. (New) The method of claim 1, wherein the one or more first and one one or more second mathematical or programmatic expressions are provided in Abstract State Machine Language (ASML) expressions.

37. (New) The one or more computer-readable media of claim 19 wherein a third data structure element of the computer program is a data type comprising a plurality of sub-types, and the domain configuration information further comprises a selection of one or more data domains corresponding to the one or more first data structure elements that are sub-types of the data type, wherein a third data domain corresponding to the third data structure element is a union of data domains of the selected data domains; and

the method further comprises producing the third data domain, the third data domain defining a set of values or tuples to be used for the third data structure element during testing and validation of the computer program.

38. (New) The one or more computer-readable media of claim 19, wherein the one or more second mathematical and programmatic expressions comprise a Cartesian product operating on at least two of the one or more first data domains.

39. (New) The one or more computer-readable media of claim 19, wherein a third data structure element of the computer program is a field or a parameter of a designated data type and the domain configuration information further indicating that a third data domain corresponding to the third data structure element is inherited from one of the one or more first data domains corresponding to the one or more first data structure elements of the designated data type; and

the method further comprising producing the third data domain, the third data domain defining a set of values or tuples to be used for the third data structure element during testing and validation of the computer program.

40. (New) The one or more computer-readable media of claim 19, wherein the one or more second mathematical or programmatic expressions comprises one or more predicates such that the second data domain comprises values or tuples that meet the one or more predicates.

41. (New) The one or more computer-readable media of claim 19, wherein a third data structure element of the computer program is a data type with a plurality of fields, and the domain configuration information further comprises information indicating that a third data domain corresponding to the third data structure element is inherited from one or more first data domains corresponding to the one or more first data structure elements that are fields of the data type; and

the method further comprises producing the third data domain, the third data domain defining a set of values or tuples to be used for the third data structure element during testing and validation of the computer program.

42. (New) The one or more computer-readable media of claim 19, wherein a third data structure element of the computer program is a method and the domain configuration information further comprises information indicating that a third data domain corresponding to

the third data structure element is inherited from one or more first data domains corresponding to one or more first data structure elements that are parameters of the method; and

the method further comprises producing the third data domain, the third data domain defining a set of values or tuples to be used for the third data structure element during testing and validation of the computer program.